

Amendment to Claims

This listing of Claims will replace all prior versions and listings of claims in this Application.

Listing of Claims

Claim 1. (CURRENTLY AMENDED) A method of forming a silicon-germanium layer on an insulator, comprising:

preparing a silicon substrate;

depositing a layer of silicon-germanium on the silicon substrate to form a silicon/silicon-germanium portion;

implanting hydrogen ions in the silicon-germanium layer, including implanting hydrogen ions taken from the group of hydrogen ions consisting of H^+ ions and H_2^+ ions, at an ion dose of between about $1 \cdot 10^{16} \text{ cm}^{-2}$ and $5 \cdot 10^{17} \text{ cm}^{-2}$ at an energy of between about 1 keV to 300 keV;

preparing an insulator substrate;

bonding the silicon/silicon-germanium portion to the insulator substrate with the silicon-germanium layer in contact with the insulator substrate to form a bonded entity;

curing the bonded entity; and

thermally annealing the bonded entity to split the bonded entity into a silicon/silicon-germanium portion and a silicon-germanium-on-insulator portion and to relax the silicon germanium layers.

Claim 2. (ORIGINAL) The method of claim 1 which further includes depositing an epitaxial silicon layer on the hydrogen-implanted silicon germanium layer before said bonding;

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and removing the silicon germanium layer from the silicon-germanium-on-insulator portion after said thermal annealing to form a relaxed silicon-on-insulator portion.

Claim 3. (ORIGINAL) The method of claim 1 wherein said preparing an insulator substrate includes preparing a glass substrate.

Claim 4. (CURRENTLY AMENDED) The method of claim 1 wherein said depositing a layer of silicon-germanium on the silicon substrate includes depositing a layer of silicon-germanium to a thickness of between about 20 nm to ~~100~~ 1000 nm in biaxial compression strain form at a germanium concentration of between about 10% to 60%, and wherein the germanium concentration is distributed in the layer taken from the group of distributions consisting of uniform distribution and graded distribution.

Claim 5. CANCELLED

Claim 6. (CURRENTLY AMENDED) The method of claim 5 ~~1~~ which includes implanting ions taken from the group of ions consisting of argon, helium and boron.

Claim 7. (ORIGINAL) The method of claim 1 wherein said bonding the silicon/silicon-germanium portion to the insulator substrate with the silicon-germanium layer in contact with the insulator substrate to form a bonded entity includes bonding by direct wafer bonding.

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Claim 8. (ORIGINAL) The method of claim 1 wherein said curing the bonded entity includes curing the bonded entity at a temperature of between about 150°C to 250°C for a time of between about one hour to fourteen hours.

Claim 9. (ORIGINAL) The method of claim 1 wherein said thermally annealing the bonded entity includes annealing the bonded entity at a temperature of between about 350°C to 700°C for a time of between about 30 minutes to four hours.

Claim 10. (ORIGINAL) A method of forming a silicon-germanium layer on a glass substrate, comprising:

preparing a silicon substrate;

depositing a layer of silicon-germanium on the silicon substrate to form a silicon/silicon-germanium portion;

implanting hydrogen ions in the silicon-germanium layer;

preparing a glass substrate;

bonding the silicon/silicon-germanium portion to the glass substrate by direct wafer bonding with the silicon-germanium layer in contact with the glass substrate to form a bonded entity;

curing the bonded entity at a temperature of between about 150°C to 250°C for a time of between about one hour to fourteen hours; and

thermally annealing the bonded entity at a temperature of between about 350°C to 700°C for a time of between about 30 minutes to four hours to split the bonded entity into a

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silicon/silicon-germanium portion and a silicon-germanium-on-glass portion and to relax the silicon germanium layers.

Claim 11. (ORIGINAL) The method of claim 10 which further includes depositing an epitaxial silicon layer on the hydrogen-implanted silicon germanium layer before said bonding; and removing the silicon germanium layer from the silicon-germanium-on-glass portion after said thermal annealing to form a relaxed silicon-on-glass portion.

Claim 12. (ORIGINAL) The method of claim 10 wherein said depositing a layer of silicon-germanium on the silicon substrate includes depositing a layer of silicon-germanium to a thickness of between about 20 nm to 100 nm in biaxial compression strain form at a germanium concentration of between about 10% to 60%, and wherein the germanium concentration is distributed in the layer taken from the group of distributions consisting of uniform distribution and graded distribution.

Claim 13. (ORIGINAL) The method of claim 10 wherein said implanting hydrogen ions in the silicon-germanium layer includes implanting hydrogen ions taken from the group of hydrogen ions consisting of H^+ ions and H_2^+ ions, at an ion dose of between about $1 \cdot 10^{16} \text{ cm}^{-2}$ and $5 \cdot 10^{17} \text{ cm}^{-2}$ at an energy of between about 1 keV to 300 keV.

Claim 14. (ORIGINAL) The method of claim 13 which includes implanting ions taken from the group of ions consisting of argon, helium and boron.

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